REPORT ON

NORTH MARA GOLD MINE
ICMI CYANIDE CODE COMPLIANCE
SUMMARY AUDIT REPORT

Submitted to:

International Cyanide Management Institute
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USA

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1.0 INTRODUCTION

Name of Mine: North Mara Gold Mine
Name of Mine Owner: Barrick Gold Africa Limited
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1.1 Location Detail and Description of Operation

Barrick Tanzania’s North Mara Gold Mine (NMGM) is located in the Tarime District, Mara-Tanzania. NMGM is approximately 38 km south of the township of Tarime, 110 km east of Musoma town centre and approximately 350 km from Mwanza. The mine is located 100km east of Lake Victoria and 20km south of the Kenyan Border. The location of the North Mara Gold Mine is illustrated in Figure 1 below.

North Mara Gold Mine is situated in the northwest highlands and the isolated Granitic Mountain Region of Tanzania. At the regional level the mine property is situated between two ridges running east-west and Northeast-south west. The topography of the mine surrounding area can be characterised by occasional hills among flat grass and farm land with slopes ranging from 1 – 15%.
In 2007, gold production at North Mara totalled approximately 237,000 ounces. Proven and probable mineral reserves as of December 31, 2007 are estimated at 3.6 million ounces of gold. The total annual mill throughput for 2008 was 2.8 Million tonnes which produced approximately 200,000oz of gold.

The site facilities are illustrated below in Figure 2 and comprise a processing plant, waste dump, raw water dam, tailings storage, pipelines, haul road, accommodation (camps) and open pits.

The North Mara mine consists of three open-pit deposits – Gokona, Nyabirama and Nyabigiena. The open pits are exploited using traditional drilling and blasting techniques. The ore is then hauled in 80 tonne dump trucks up to 12km to the Run of Mine (ROM) ore pad at Nyabirama. Both oxide and sulphide reserves are mined and processed by conventional carbon-in-leach (CIL) technology. The processing plant uses between 54 and 82 tonnes of NaCN per month, depending on throughput tonnage, grade and ore type.
Mining Licence ML17/96 and ML18/96 were granted in August 1996 and re-granted under the 1998 Mining Act as Special Mining Licences (SML's) 17/96 and 18/96 on 7th February 2000. Construction commenced in 2000 and mining in 2001. Mining licenses pertaining to the NMGM activities are valid until year 2011. In 2000 an Environmental Management Plan for Nyabirama was submitted and approved. An extension to the existing SML’s was agreed under section 45 of the Environmental Management Act, 2004. Two Supplementary EMP’s (SEMP) were submitted to Government which was approved during 2003 for Gokona & Nyabigena and the Nyabirama SEMP was approved during 2002 to cater for project expansion.

1.2 Process Description

Run of mine (ROM) ore is tipped onto a stockpile and the reloaded into a ROM bin by means of a front end loader. The ore is drawn out of the ROM bin and fed onto a vibrating grizzly screen by means of an apron feeder. The undersize material passes through the grizzly onto a conveyor belt while the oversize material passes through a jaw crusher which discharges onto the same conveyor belt. The ore is fed onto a banana screen via a two tier conveyor system. The undersize from the banana screen passes onto a conveyor belt which feeds the SAG mill feed stockpile while the oversize material is fed into a secondary crusher. The crushed ore from the secondary stockpile is tipped onto the SAG mill feed stockpile.
The ore is drawn from underneath the SAG mill feed stockpile onto the SAG mill feed conveyor belt by means of three vibrating feeders. It is fed into the SAG mill for primary grinding. The SAG mill discharge is pumped to a cluster of thirteen cyclones for classification. The cyclone overflow is fed onto the trash screen while the underflow is split between two ball mills for regrinding and onto a scalping screen. The discharge from the ball mills is pumped to the cyclone cluster for classification. The scalping screen underflow is fed into two Knelson Concentrators while the overflow is fed back into the SAG Mill. The concentrate from the Knelson Concentrators is fed to the Acacia reactor in the gold room while the tails are fed back into the ball mills. The residue from the Acacia reactor is fed to the regrind mill and back into the CIL circuit.

The trash screen overflow falls into a bunker while the underflow is fed into the leach adsorption circuit comprising of three leach tanks and seven adsorption tanks which are in series. Loaded carbon is recovered from the first tank of the adsorption train and transferred to acid washing. Anglo American Research Laboratories elution and electrowinning. The slurry from the final adsorption tank is fed into two thickeners via two carbon safety screens. The water recovered from the thickener overflow is recovered and used in the plant as process water while the thickened underflow is pumped the Tailings Storage Facility.

The cathodes in the electro winning cells are washed with high pressure spray water and the gold slime is recovered in a plate and frame filter press. The gold sludge filter cake is dried in calcination ovens and smelted on site before being dispatched.

**Figure 3: North Mara – Process Plant Flow sheet**
This operation is in full compliance with the International Cyanide Management Code.

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Names and Signatures of Other Auditors:

Laura Steele BSc (Hons), AIEMA, MIEEM

Sofia Grahn MEng

Dates of Audit: 25 October 2008 to 1st November 2008

I attest that I meet the criteria for knowledge, experience and conflict of interest for Code Verification Audit Team Leader, established by the International Cyanide Management Institute and that all members of the audit team meet the applicable criteria established by the International Cyanide Management Institute for Code Verification Auditors.

I attest that this Summary Audit Report accurately describes the findings of the verification audit. I further attest that the verification audit was conducted in a professional manner in accordance with the International Cyanide Management Code Verification Protocol for Gold Mine Operations and using standard and accepted practices for health, safety and environmental audits.

Alistair Cadden CEng MIMMM AIEMA

Golder Associates

I certify that I was present and saw the above named sign this document at 33 Queen Street, Maidenhead, Berks. U.K. this...day of...2009.

Adrian Peter Mark Watney
Notary Public
1. PRODUCTION

Encourage responsible cyanide manufacturing by purchasing from manufacturers who operate in a safe and environmentally protective manner.

*Standard of Practice 1.1*

*Purchase cyanide from manufacturers employing appropriate practices and procedures to limit exposure of their workforce to cyanide, and to prevent releases of cyanide to the environment.*

The operation is in **full compliance** with Standard of Practice 1.1.

North Mara purchases its sodium cyanide from Orica Australia Pty Ltd under a Sodium Cyanide Supply Agreement, developed by the parent company Barrick Tanzania. In addition to the contract, Orica, the cyanide producer, was certified as compliant under the Code on 28 November 2006.
2. TRANSPORTATION

Protect communities and the environment during cyanide transport.

Standard of Practice 2.1

Establish clear lines of responsibility for safety, security, release prevention, training and emergency response in written agreements with producers, distributors and transporters.

The operation is in full compliance with Standard of Practice 2.1.

North Mara purchases its sodium cyanide from Orica Australia Pty Ltd under a Sodium Cyanide Supply Agreement. This agreement covers the responsibilities of the supplier and all its subcontractors. It establishes clear lines of responsibility for safety, security, release prevention, training and emergency response. Specific requirements of the cyanide supply agreement include that:

- All goods must be packed, marked and transported in a proper and suitable manner and in all cases in accordance with industry best practice;

- The supplier shall at all times comply with the International Cyanide Management Code; and

- The transporter and all subcontractors used for delivery of cyanide, have successfully passed third-party independent Code certification audits or alternatively, an equivalent audit demonstrating responsible cyanide management for either the individual transport company’s activities or the transport activities along the entire supply chain.

It is considered that this constitutes full compliance with the code.

Standard of Practice 2.2

Require that cyanide transporters implement appropriate emergency response plans and capabilities and employ adequate measures for cyanide management.

The operation is in full compliance with Standard of Practice 2.2.

North Mara sources all its sodium cyanide requirements from Orica Australia Pty Ltd. The Supply Agreement requires that the Suppliers and transporters and their sub-contractors are certified under the Code.

An audit of the cyanide supply chain has been carried out at the end of January 2008. Cyanide produced by Orica at its Yarwun plant in Queensland, Australia, bound for Tanzania is packaged in intermediate bulk containers (IBC), which are in turn packed into a container. A maximum of 20 IBCs can be packed into a freight container with a maximum gross weight
of 28 tonnes. The containers are loaded at Yarwun and transported by road, approximately 2 km to the Mt. Miller rail yard by Toll Resources (Gladstone); here QR National transports the product via rail to the Brisbane Multimodal Terminal located at the Port of Brisbane. The containers are exported through the Port of Brisbane and delivered by shipping company MSC to the port of Mombasa in Kenya.

A Code Equivalent Third Party Audit assessed transportation within Queensland as being fully compliant in March 2007. Due diligence audits have been carried out of Port of Brisbane (May 2007), Port of Mombasa (December 2007) and of Maersk Shipping Company (April 2007). A review of Orica’s due diligence evaluations has been completed by a qualified transportation expert pre-certified by the ICMCI on 3rd February 2009. The Auditor was satisfied that the due diligence assessments completed for the Ports of Brisbane (Australia), Dar es Salaam (Tanzania) and Mombasa (Kenya), and for the shipping of cyanide between the ports by MSC demonstrate that Orica has reasonably evaluated these facilities and their cyanide-related operations and that necessary management measures are implemented to the extent practical, satisfy the requirements of both Orica itself and of the ICMC.

An audit of the cyanide transporter within Kenya and Tanzania, FFK, was carried out in January 2008, and was certified compliant with the code on 22 May 2008.
3. HANDLING AND STORAGE

Protect workers and the environment during cyanide handling and storage.

Standard of Practice 3.1

Design and construct unloading, storage and mixing facilities consistent with sound, accepted engineering practices, quality control/quality assurance procedures, spill prevention and spill containment measures.

The operation is in full compliance with Standard of Practice 3.1.

Reagent cyanide is delivered to the site in briquette form in 1.1 tonne woven textile bulk bags. The bulk bags are placed inside a polyethylene bag and into a plywood box with integral pallet. The boxes are transported in secure sea containers which are then currently left in an area of hard standing. The container is lifted from the truck bed and the boxes are unloaded from the container with a fork lift truck in accordance with North Mara Gold Mine’s (NMGMGL) Standard Operating Procedure ‘SOP-SC-30 Unloading Cyanide Container & Cyanide Boxes’. These facilities meet code requirements in terms of siting, general layout and all major design principles.

Sodium cyanide solution is mixed and stored in the reagent preparation area of the plant. The mixing and storage tanks are made from mild steel and are within the concrete containment bunds of the plant. The equipment for hoisting cyanide boxes, bag splitting and washing are compliant with the manufacturer’s recommendations and have been approved by the Tanzanian authorities. Construction QA/QC documentation is available for the facility and has been signed off by the designers, Ausenco. A high level alarm set to 95% is fitted to the cyanide mixing/storage tanks and is directly linked to the control room. The cyanide unloading and storage areas are located away from people and surface water courses.

Standard of Practice 3.2

Operate unloading, storage and mixing facilities using inspections, preventive maintenance and contingency plans to prevent or contain releases and control and respond to worker exposures.

The operation is in full compliance with Standard of Practice 3.2.

The operation has developed and implemented plans or procedures to prevent exposures and releases during cyanide unloading and mixing activities. Procedures for unloading, handling and mixing cyanide cover the following issues:

- Obtaining the necessary permissions to take cyanide from the store, PPE, testing safety equipment, operation of manual and automatic valves, removal of cyanide from the
boxes and safe lifting of the bags, decontamination of the bags, spillage control, and clean up of the area after mixing:

- Handling cyanide containers to ensure they are not punctured or ruptured during handling. This includes the use of a banksman for assisting the forklift driver while unloading boxes for the cyanide store:

- Limiting the height of stacking of cyanide boxes within the containers to a maximum of 2 boxes high and singly in the cyanide mixing area:

- Timely clean up of any spills of cyanide during mixing. Any spillage invokes the spill emergency response plan and equipment is on hand in the vicinity of the storage and mixing area to clean up and neutralise any spills. This procedure is detailed in SOP.PL.T-CN-01 and 02:

- Use of full PPE comprising full face mask and canister, chemical protection suit, long rubber gloves, rubber boots, personal HCN monitor and radio for all mixing crew members:

- A two man team is required to carry out cyanide mixing, one of who acts as an observer while the other is working.

Standard operating procedures, operator training and practices have been developed to manage effectively and safely the cyanide unloading and clean-up activities. An Observer is in attendance during unloading. A cyanide mix was observed by the auditor and it was clear that the operators had been trained in the procedures and correct use of PPE. Standard operating procedures and operator training are effective in managing unloading practices.

Empty NaCN containers are disposed of such that they cannot be used for other purposes. The cyanide bag splitter has an integral washing system and NMGM procedures call for washing the bags 3 times before being placed back into the wooden boxes. These wooden boxes are then taken back to the cyanide store for temporary storage before being taken to the incineration area for burning. The incinerator is within the secure gold processing compound. No cyanide packaging is returned to the vendor. The inside of the sea containers in which the cyanide is delivered is inspected for spilled cyanide, and cleaned out in accordance with the site’s dry cyanide spill procedure if necessary (SOP.PL.T-CN-02 Cyanide- Cleaning Dry Spill).
4. OPERATION

Manage cyanide process solutions and waste streams to protect human health and the environment.

*Standard of Practice 4.1*

Implement management and operating systems designed to protect human health and the environment utilizing contingency planning and inspection and preventive maintenance procedures.

The operation is in **full compliance** with Standard of Practice 4.1.

To ensure that the facility is operated in accordance with the Code, procedures have been developed and implemented for the following areas:

- Cyanide unloading and storage facilities;
- Leaching and detoxification systems;
- Tailings storage principles and operations;
- Preventative maintenance;
- General risk management procedures;
- Cyanide management procedures; and
- Emergency management.

There are 100 written procedures with respect to management and handling of cyanide facilities under normal operating conditions, for planned maintenance and also for unexpected events. A number of computerised systems are also in operation at the mine to facilitate data management:

- Maintenance schedules controlled in the PRONTO planned maintenance system;
- Water balance controlled using GoldSim software;
- Environmental data managed using an in-house database system; and
- Environmental, training and safety data managed using RIMS (Responsibility Information Management System).

Records are maintained and were available for inspection by the auditors.

The operation has plans and procedures to carry out inspections and preventative maintenance activities such as:

- Tank inspections and refurbishments;
- Tank wall thickness testing;
- Cyanide Solution Pumps

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- Inspection of tailings pipelines
- Hi/Lo level indicators and alarms on cyanide mixing and storage tank
- HCN monitors
- pH meters

The operation has developed formal cyanide management documents that address contingency procedures for situations when inspections and monitoring identify a deviation from design or standard operating procedures.

The mine has a positive water balance, and has instigated measures to remove water from the system including the use of misters to encourage evaporation of excess water. In the case that water must be discharged, water from the open pit dewatering systems, which is not contaminated with cyanide, is released. Permissions are obtained from NEMC and the Lake Victoria catchment authority prior to discharge.

The operation inspects cyanide facilities on an established frequency sufficient to assure and document that they are functioning within design parameters. Cyanide facilities are inspected daily with inspections recorded on daily logs. For the TSF a more rigorous annual inspection is undertaken by the designers to verify that it is being operated in accordance with their recommendations. Where facilities are found to be functioning outside their design parameters, such as leaking pipework and pumps, the faults are recorded and work orders generated to ensure that the problems are resolved.

The operation inspects the following at unloading, storage, mixing and process areas:

- Tanks holding cyanide solutions, for structural integrity and signs of corrosion and leakage, such as encrustation with salts;
- Secondary containments for the presence of fluids, their available capacity and to ensure that any drains are closed and, if necessary, locked, to prevent accidental releases to the environment; currently secondary containment is inadequate;
- Pipelines, pumps and valves for deterioration and leakage; and
- Ponds and impoundments for the parameters identified in their design documents as critical to their containment of cyanide and solutions and maintenance of the water balance, such as available freeboard and integrity of surface water diversions.

All power requirements for North Mara are currently provided by on site diesel generators. The generating capacity on site comprises 18 generators. Under normal conditions 14 are operational and 4 on standby. The generators have a total capacity of 13.5MW. Ten days fuel supply for the generation system is held on site. All generator units are checked monthly according the Pronto PM schedule.
The site has three diesel powered pumps that can be used in the event of a power outage or pump failure. It is considered that this provision is adequate to prevent unintentional releases and exposures in the event that primary power supply is interrupted.

**Standard of Practice 4.2**

*Introduce management and operating systems to minimize cyanide use, thereby limiting concentrations of cyanide in mill tailings.*

The operation is in **full compliance** with in Standard of Practice 4.2.

The operation conducts a program to determine appropriate cyanide addition rates in the mill and evaluate and adjust addition rates as necessary when ore types or processing practices change cyanide requirements. Records of original metallurgical assessments, undertaken by Ammttec in 1995, were available in the Ausenco feasibility study December 2003 and the original Ammttec laboratory testwork reports (the latter from 1995, 2005 & 2008).

Ongoing cyanide addition rates are controlled by a TAC2000 inline monitor that automatically activates the dosing pumps through the SCADA system, but manual titrations are taken as a back up, and records kept in the CIL plant daily log. The operation has evaluated various control strategies for cyanide additions and has decided to use a combination of in-line analysis and automatic dosing, backed up by manual titration and dosing. This is assessed by the plant metallurgist on a daily basis and communicated to the CIL plant operators via e-mail.

**Standard of Practice 4.3**

*Implement a comprehensive water management program to protect against unintentional releases.*

The operation is in **full compliance** with in Standard of Practice 4.3.

North Mara has developed a comprehensive, probabilistic water balance for the site. The model recognises that there are no leach pads at North Mara and inputs to the model include plant throughputs and tailings slurry density.

The model simulates rainfall on a daily basis derived from rainfall records from Musama dating from 1997 to 2005 and site derived data from 01/01/04 to date. Storm events have been derived from the rainfall records and are applied using a Monte Carlo simulation technique. This rainfall record generator was used to generate 10-year daily rainfall sequences that match the rainfall pattern at the North Mara Mine at daily, weekly, monthly, annual and 10 year durations. A 1 in 100 yr 24hr storm event of 116 mm has been estimated from the meteorological data and applied in the model.
North Mara inspects the ponds and impoundments and monitors the freeboard available. The process water pond has an automatic pumping system with hi-lo switches and an audible and visual alarm to give warning if the allowable freeboard is encroached. It is considered that this approach provides a sufficient degree of confidence that overtopping of the pond or impoundment can be prevented during the operational life of the facility.

The water balance has been prepared for the whole site. It takes into consideration the site topography: water diversion measures; surface runoff from the up gradient watershed; adjustments to account for differences in elevation and infiltration of the runoff into the ground; flows of surface water including raw water pumped from the Mara River, rainfall, reclaim water from the tailings dam, dewatering form the open pits and run-off from the plant site.

Since the site is at equatorial latitude at moderate altitude (1270m asl), the effects of potential freezing and thawing conditions on the accumulation of precipitation within the facility and the up gradient watershed are not relevant to North Mara.

Seepage modelling has been undertaken to estimate losses into the ground for incorporation into the model. The results of this modelling appear reasonable. There are no surface water discharges from cyanide facilities at North Mara. However, it is foreseen that there may be requirements to discharge in the future during the rainy season. In view of this, the site has a procedure for managing its water balance to ensure that cyanide bearing waters are not discharged and to ensure that surface water discharge requirements will be met.

The effects of potential power outages or pump and other equipment failures on the drain down from a leach pad or the emergency removal of water from a facility have been considered in the model. Contingency plans including the provision of diesel powered back up pumps have been put in place in the unlikely event that on-site duty and back-up power generation systems fail and the pumps also fail.

The probabilistic water balance model is being used to actively manage the site’s water balance with respect to pumping fresh water from the Mara River or discharging from the open pits. Site precipitation records have been compared to the design assumptions, and have been used to update the site water balance.

**Standard of Practice 4.4**

*Implement measures to protect birds, other wildlife and livestock from adverse effects of cyanide process solutions.*

The operation is in **full compliance** with Standard of Practice 4.4.
There are no areas in North Mara where WAD cyanide concentrations in open waters exceed 50mg/L. The mine has implemented a process water recirculation system to ensure the WAD CN concentration in the tailings discharge is below 50mg/L. Since the commissioning of this system in November 2008, the tailings are discharged into the pond at an average WAD CN concentration of 40mg/L with a maximum value recorded of 80mg/L. The maximum value was attributed to a pump failure which impacted the ability to recirculate water. This was an isolated event and not considered by the auditor to constitute non-compliance.

Records viewed by the auditor showed that the maximum concentration of WAD cyanide in the TSF pond was 16.85mg/L with an average of 1.11mg/L between 30/01/07 and 29/07/08. Since implementation of the water recirculation system in November 2008 this has reduced to an average of 0.12mg/L with a maximum recorded value of 0.46mg/L.

Incidents have been reported of wildlife and/or livestock becoming stuck in the soft tailings. To prevent this, the current method adopted by NMGM is maintaining two guards around the TSF. Records maintained at North Mara demonstrate that wildlife mortality is not a significant issue. 10 animal mortalities have been recorded at the TSF, and 5 at the CIL plant from 24/08/02 to date. Autopsies carried out by the Government veterinary service in Mwanza on a number of these animals indicate that cyanide poisoning was not the cause of death.

*Standard of Practice 4.5*

*Implement measures to protect fish and wildlife from direct and indirect discharges of cyanide process solutions to surface water.*

The operation is in full compliance with Standard of Practice 4.5.

North Mara does not have a direct or indirect discharge to surface water from cyanide facilities during normal operations. The site has however discharged water from the open pit dewatering system that is not contaminated with cyanide, on specific occasions when the project water balance has required it. These discharges are subject to permission from National Environmental Management Commission of Tanzania (NEMC) and the Lake Victoria Water Basin Office (LVWBO).

Analyses of groundwater obtained during environmental monitoring around the TSF and at other locations in the site have detected cyanide. WAD cyanide concentrations in the TSF seepage have been measured at a maximum 0.29mg/L with an average of 0.14mg/L between 05/01/08 and 21/01/09. Surface water monitoring between Jan 08 and Oct 08 at the Mara River has not detected free and WAD cyanide (detection limits 0.014mg/L and 0.08mg/L respectively), indicating that it is not impacted by the operation.
Standard of Practice 4.6

Implement measures designed to manage seepage from cyanide facilities to protect the beneficial uses of ground water.

The operation is in \textbf{full compliance} with Standard of Practice 4.6.

There are no beneficial uses of groundwater immediately downgradient of North Mara and the site does not use mill tailings for backfill.

Standard of Practice 4.7

Provide spill prevention or containment measures for process tanks and pipelines.

The operation is in \textbf{full compliance} with Standard of Practice 4.7.

Adequate spill prevention and containment measures have been provided around the cyanide unloading, storage, mixing and leach facilities at N Mara.

The cyanide mixing and storage tanks are seated on a reinforced concrete slab. Lysimeters have been installed under the leach tanks within the ring beams to enable monitoring for any leakage. The operation has developed a monitoring and action plan for the ring beams. To date the lysimeters have been dry and no sample has have been recovered, indicating that no cyanide solution has been released through the base of the tanks.

NMGML has made an undertaking in its EMP to remediate any contaminated soil and groundwater as part of the mine closure plan.

The secondary containment provided at North Mara is sized to accommodate 2,120\,m$^3$ according to the mine’s survey of the facility. This is approximately 75\% greater than the largest tank capacity and is considered adequate by the auditor.

Sump pumps are in place to pump any solution that collects in the secondary containment either to the CIL or tails. The pumps were working adequately at the time of the site visits.

Pipelines within the plant area are contained within the secondary containment bunds. The tailings line and return water line are in a bunded ditch that is sloped towards the TSF or raw water pond in the event of a release of solution. A differential flow meter system is being implemented on the tailings pipeline and return water line to alert the CIL operators of any pipeline failures.

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The nearest natural surface water body is the Mara River, approximately 7km to the NW of the site. NMGML has evaluated the river as not requiring any additional special protection measures.

Cyanide tanks and pipelines are constructed of materials such as reinforced concrete, stainless steel, carbon steel and polyethylene. These are considered compatible with cyanide and high pH conditions.

Standard of Practice 4.8

Implement quality control/quality assurance procedures to confirm that cyanide facilities are constructed according to accepted engineering standards and specifications.

The operation is in full compliance with Standard of Practice 4.8.

The operation is in full compliance with Standard of Practice 4.8 requiring that operations implement QA/QC procedures to confirm that cyanide facilities are constructed according to accepted engineering standards and specifications. Comprehensive ‘as-built’ information and CQA records, reports and inspection reports produced by Ausenco are held by the construction department for leach tank welding and for the TSF construction. Ausenco has provided a letter to NMGML stating that the works were supervised full time by their engineers and that Ausenco is satisfied that the works were completed in accordance with the project designs and specifications.

NMGML has implemented QA/QC procedures for recent works to improve the secondary containment at the site, including concrete inspection form and cube tests.

Standard of Practice 4.9

Implement monitoring programs to evaluate the effects of cyanide use on wildlife, surface and groundwater quality.

The operation is in full compliance with Standard of Practice 4.9.

North Mara is in full compliance with Standard of Practice 4.9 requiring that operations implement monitoring programs to evaluate the effects of cyanide use on wildlife, surface and groundwater quality.

The operation has written standard procedures for monitoring activities for wildlife, surface and groundwater quality which were prepared by appropriately qualified persons. The procedures contain information on how and where samples should be taken, sample preservation techniques, chain of custody procedures, shipping instructions, and cyanide
species to be analysed. North Mara personnel conduct all environmental ground water monitoring for both compliance and internal purposes. Selected surface water and process water samples are also collected. Groundwater sampling conditions and procedures are documented in writing, conducted in accordance with these written procedures contained within a sampling manual developed by Mr. John McKenna, a Fellow of the Royal Australian Chemical Institute, and a Member of the Australian Institute of Mining and Metallurgy. The analyses for WAD cyanide is carried out in accordance with the Standard methods for water and wastewater, 20th Ed by American Public Health Association, American Waterworks Association and American Environment Federation, accredited to ISO 17025.

Monitoring is conducted at frequencies adequate to characterise the medium being monitored and to identify changes in a timely manner. Sampling conditions (e.g., weather, livestock/wildlife activity, anthropogenic influences, etc.), and procedures are documented in writing. Monitoring of groundwater is undertaken at 7 monitoring boreholes and 2 water supply wells down gradient of the site. A further 10 monitoring boreholes have recently been installed with monitoring scheduled to commence in February 2009.

The operation inspects for and records wildlife mortalities related to contact with and ingestion of cyanide solutions. A daily record is kept of wildlife observations. The presence of any dead fauna is notified to the Environment Manager and an incident report is raised. Where animal mortalities are encountered the corpses are sent to Mwanza for autopsy by the Government Veterinary Service.
5. DECOMMISSIONING

Protect communities and the environment from cyanide through development and implementation of decommissioning plans for cyanide facilities

Standard of Practice 5.1

Plan and implement procedures for effective decommissioning of cyanide facilities to protect human health, wildlife and livestock.

The operation is in full compliance with Standard of Practice 5.1.

This Standard of Practice requires that operations plan and implement procedures for effective decommissioning of cyanide facilities to protect human health, wildlife and livestock.

The operation has a Mine Decommissioning Procedure and has developed a Reclamation and Closure Plan as well as a Decontamination and Decommissioning Plan which include an implementation schedule and frequency for documentation review. Details are also provided in the form of a Gantt-style schedule for decommissioning, planning and monitoring leading up to the closure, post-closure clean-up activities, plant dismantling and water quality monitoring. The plan is regularly updated, the most recent update being undertaken in 2008. The cost estimates for closure are updated annually in line with Barrick’s corporate accounting procedures.

Standard of Practice 5.2

Establish an assurance mechanism capable of fully funding cyanide related decommissioning activities.

The operation is in full compliance with Standard of Practice 5.2.

A detailed cost estimate for third party implementation of works has been included in the Reclamation and Closure Plan (RCP) (May 2008). The total closure costs have been calculated to amount to US$ 26.7 million. The operation has established a self-guarantee as a financial assurance mechanism to fund the anticipated closure and decommissioning costs at North Mara. A statement has been provided by a qualified financial auditor, McMullen McPhee & Co. LLC that North Mara has sufficient financial strength to fulfil this obligation as demonstrated by U.S. Code of Federal Regulations at 40 CFR 264.143(f), 30 CFR 800.23, 10 CFR 30. Appendix A. McMullen McPhee LLC is a Certified Public Accountant firm licensed in Nevada, USA. Proof of their licensure is found on the State of Nevada’s website:

- http://www.nvaccountancy.com/search.fx?show=4115

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6. WORKER SAFETY

Protect workers' health and safety from exposure to cyanide.

*Standard of Practice 6.1*

*Identify potential cyanide exposure scenarios and take measures as necessary to eliminate, reduce or control them.*

The operation is in full **compliance** with Standard of Practice 6.1.

A series of Standard Operating Procedures (SOPs) have been developed for all cyanide related tasks at North Mara. The procedures require, where necessary, the use of PPE such as personal HCN gas monitors, and need to perform pre-work inspections. Cyanide-related safety material is included in site inductions and training packages. Material Safety Data Sheets in English and Swahili for cyanide are also available at key positions around the site, such as the CIL control room, the cyanide stores and the cyanide mixing area. Specific on and off the job training is given to workers with respect to SOP's that involve cyanide. Training records are maintained on site.

The operation has a change management system in order to identify risks and hazards associated with a 'change', and the means to control those identified risks and hazards. The operation formally solicits and actively considers worker input in developing and evaluating general health and safety procedures through various means such as weekly environmental, health and safety meetings; Hazard Identification Booklets; and Tool box talks.

*Standard of Practice 6.2*

*Operate and monitor cyanide facilities to protect worker health and safety and periodically evaluate the effectiveness of health and safety measures.*

The operation is in full **compliance** with Standard of Practice 6.2.

North Mara has undertaken an assessment of the lime, pH and free cyanide relationship within its process to determine optimum mixing rates. A typical operating pH of 10.5 has been established.

Where the potential exists for significant cyanide exposure, the operation requires the use of personal monitoring devices to confirm that controls are adequate to limit worker exposure to HCN gas. The operation uses Monotox personal cyanide meters; ToxiPro Single Gas detectors (Sperian); and GasBadge (Industrial Scientific) personal monitors.
The Monotox personal HCN monitors are set to alarm at two different readings: 4.7 ppm; and a second alarm at 10 ppm. If the alarm sounds at 4.7 ppm, the SOPs require that the shift supervisor is contacted; and at 10 ppm, this requires evacuation of all personnel from the area and barricading to prevent entry. The shift supervisor then designates someone to investigate the source of the elevated concentration, wearing the appropriate PPE.

A register is kept for the HCN monitoring equipment in order to ensure it is maintained, tested and calibrated as directed by the manufacturer, and records retained for at least one year. Showers, low-pressure eyewash stations and dry-powder (ABC) fire extinguishers are located at strategic locations throughout the operation in the cyanide areas, and are maintained, inspected and tested on a regular basis.

Warning signs have been placed where cyanide is used, advising workers where cyanide is present; prohibiting smoking, open flames, eating and drinking; and that, if necessary, suitable PPE must be worn. Access is restricted to the process plant area, with no one permitted to enter the processing area until they have completed the induction and cyanide awareness training. Tanks and piping containing process solutions (i.e. > 0.5 mg/L WAD) are adequately labeled and the tanks containing cyanide had “CYANIDE” painted on them plus accompanied signage.

Specific tasks have been identified as high risk activities that require a high level of PPE whilst performing these tasks. The same is the case for identified specific locations around the mine site.

MSDSs, first aid procedures and informational materials on cyanide safety were available in the language (English and Swahili) of the workforce and are available in areas where cyanide is managed and procedures are in place for investigation and evaluation of cyanide incidents.

Procedures are in place, and are being implemented, to investigate and evaluate cyanide exposure incidents to determine if the North Mara programmes and procedures to protect worker health and safety, and to respond to cyanide exposures, are adequate or need revising. As an incident occurs, the incident report form is completed by the individual and their supervisor. This is then entered into the Responsibility Information Management System (RIMS) System by the Safety Management Operating System Administrator: where corrective actions are input and tracked to ensure that the relevant personnel close them out. One of the outputs from the RIMS system, the North Mara Incidents Action Plan Register, is reviewed bi-weekly at the Head of Department Safety Management Meetings. Ten incident reports related to cyanide were reviewed on the RIMS system.
Standard of Practice 6.3

*Develop and implement emergency response plans and procedures to respond to worker exposure to cyanide.*

The operation is in **full compliance** with Standard of Practice 6.3.

The operation has the necessary equipment or appropriate measures in place to respond accordingly in the event of a worker exposure to cyanide. Medical emergency equipment is regularly inspected and personnel on site are suitably trained to provide medical assistance, plus procedures are in place to transport workers exposed to cyanide to locally available qualified off-site medical facilities if necessary.

Mock emergency drills are conducted periodically to test response procedures for, and lessons learned from the drills are incorporated into response planning, through debriefs and verbal communication between departments.

North Mara has the necessary equipment in order to respond in the event of worker exposure to cyanide and suitable means of communication are available within cyanide areas. This was seen by the auditor at the time of the audit and included potable water supply: a cyanide emergency response kit (with a resuscitator and spare oxygen cylinder), and two way radios.

Cyanide antidotes are kept under suitable conditions and temperature range. Supplies are kept at the on-site Clinic, with emergency ampoules of amyl nitrate kept at the Mill Supervisor’s Office, Mill Control Room, and Gold Room.

North Mara regularly inspects its first aid equipment, predominantly via the use of equipment checklists. Evidence of this was seen by the auditor in the form of completed checklists, electronic templates and by talking to site personnel. For example, safety showers are tested each week and tests are incorporated into the workers SOPs; fire extinguishers are checked every three months and are all re-charged on site. There are fourteen standardised First-Aid kits and six oxy-viva units on site. These are checked by site Doctors and/or Clinic personnel.

The Medical/Clinic staff also conduct weekly inspections of all packs for handling cyanide poisoning at the four locations within the site. It is their responsibility to check the temperature at which the Antidote Kits are stored (as per supplier’s recommendations): expiry dates; and for any general damage to the kits and report any problems to the Health Coordinator/Medical Officer.

North Mara has developed specific written emergency response plans and procedures to respond to cyanide exposures. These are specifically detailed within the operation’s Emergency Crisis Management Plan (ECMP). This addresses cyanide emergencies, cyanide
detoxification procedures, and environmental spill procedures. Aspects of this Plan also address emergency response procedures to respond to potential cyanide exposures.

North Mara has its own fully-equipped Medical Centre near to the entrance of the mine site. It is open every day from 07:00 to 17:00 and available 24 hours a day for emergency treatment. A fully equipped diesel 4WD ambulance is stationed at the medical centre and attended by paramedics. There are three fully qualified medical doctors on rotation at North Mara so that there is always a minimum of two on site at any one time, assisted by at least two fully trained paramedics.

North Mara’s medical team has the capability and necessary equipment to provide primary first aid and medical assistance to workers exposed to cyanide. Extensive medical equipment and personnel are provided by the clinic and a fully trained and equipped Emergency Response Team (ERT) is available to assist. Members of the ERT are trained to provide a suitable level of first aid treatment.

Procedures are included within the Site Emergency Crisis Management Plan (ECMP) detailing how to transport workers to off-site medical facilities. In addition there is a Medical Evacuation Procedure dealing possible requirements for evacuation; contact information; and how this would be implemented. An agreement is in place with AMREF Flying Doctors to allow for emergency evacuation assistance. Contact has been made with the Aga Khan Hospital in Dar es Salaam and Nairobi Hospital (Kenya) for additional medical assistance with respect to treating cyanide poisoning cases.

NMGML periodically conducts mock emergency drills to test response procedures. Recently completed emergency drills have included a cyanide spill and possible cyanide-exposed patient; and two ‘man-down’ drills at the cyanide mixing area. As part of the drill procedures, any follow up actions and responsibilities are specified with due dates set by which the action must be completed by. In addition an ‘Emergency Response Action Tracker’ is in place to allow the ERT Coordinator to track the status and due dates set by which the action must be completed by. A progress bar colour-coding system is used to track the completion of these actions. A ‘man down’ drill carried out on 19/12/08 revealed that several employees needed to undergo Oxy-Viva retraining, and this was carried out on 23/12/08. Further retraining was carried out on 05/01/09 for personnel working in the CIL area.
7. EMERGENCY RESPONSE

Protect communities and the environment through the development of emergency response strategies and capabilities.

Standard of Practice 7.1

Prepare detailed emergency response plans for potential cyanide releases.

The operation is in full compliance with Standard of Practice 7.1.

The operation has developed specific written emergency response procedures to enable appropriate response to cyanide exposures. Specific emergency procedures that relate to cyanide emergency incidents are included within the North Mara Mine ECMP. These cover 20 scenarios for onsite and offsite incidents, such as a pipeline ruptures spill from the TSF and accidents during transportation. The emergency response plans reference those of the cyanide transport company FFK. The use of first aid measures for cyanide exposure are also referenced in the Emergency Crisis Management Plan (ECMP) and covered in training received and documents present at the site.

It is considered that the Plan addresses the types of emergencies and responses as appropriate to its workings and setting. The degree of detail for each emergency response is appropriate: the nature of potential receptors; and the controls in place at the facility. The specific response actions within each emergency procedure ensure that the incident is dealt with accordingly from start to finish.

NGMGL’s procedure is that the ECMP will be reviewed at least annually and in line with any recommendations following emergencies. Emergency de-briefs (e.g. from drills) and recommendations from Emergency Plan reviews at other operations. Subsequently, this provides the opportunity for assessment, mitigation and future prevention of releases.

Standard of Practice 7.2

Involve site personnel and stakeholders in the planning process.

The operation is in full compliance with Standard of Practice 7.2.

NGMGL has involved workers and the local communities in the development of the ECMP, and has provided information to them on appropriate emergency response measures. Procedures have been created to ensure North Mara mine site personnel respond appropriately in case an impact occurs in the local community. NGMGL has recognised that this is particularly important due to the number of small communities that surround the site in relatively close proximity.
North Mara has involved external response agencies in case support is required for treating emergency cyanide patients. For example, the operation are in communication with AMREF: external medical facilities and has a Mutual Aid Agreement with the local mine sites. A series of cyanide awareness workshops have been held at some local villages; monthly village tours implemented; leaflet drops have been made (these include details on ‘How do we Transport Cyanide’; and ‘What to do in case of an accident’ - available in Swahili and English); plus the cyanide transporter (Freight Forwarders Kenya FFK) has delivered a series of presentations to local communities along the transportation route. This is an ongoing progress with the mine’s community relations group regularly visiting local communities and schools to reinforce how to deal with an emergency involving cyanide.

NMGMIL has entered into a mutual aid agreement with its sister mines, Bulyanhulu, Tulavaka and Buzwagi with respect to assisting during a cyanide emergency. The local civil authorities and police have been informed of the mine’s emergency response plans.

**Standard of Practice 7.3**

*Designate appropriate personnel and commit necessary equipment and resources for emergency response.*

The operation is in **full compliance** with Standard of Practice 7.3.

The operation is in full compliance with this Standard of Practice which requires an operation to designate appropriate personnel and commit necessary equipment and resources for emergency response.

An Emergency Response Team (ERT) is identified within the ECMP. Emergency Response Coordinators are also identified in the ECMP. A current list of all ERT members is included within the ECMP in tabular format. The list of Key Contacts for Emergency Situations and Contact Directories within the ECMP designate appropriate personnel required to respond in case of an emergency and lists their responsibilities. A minimum of 6 ERT members are available on each shift.

The ECMP states that all ERT members will be trained in First Aid; Vehicle Extrication; Open Circuit Breathing Apparatus; Rope Rescue; Industrial Fire Fighting; Hazardous Materials; and Search and Rescue. Training is provided either on or off-site by an accredited training provider or by the Emergency Response Coordinator or his delegate, depending on the type of training. Currently the majority of the training is done externally with MAT Training Solutions. Evidence that this training is provided was seen by the auditor at the time of the audit.

Emergency response equipment is listed within the ECMP as appropriate under certain emergency procedures and general information on cyanide. The ECMP also details that a list
of all checklists for medical, fire fighting and rescue equipment is available in the ERT Coordinator’s Office, which was verified at the time of the audit. The emergency response equipment off-site is the responsibility of FFK.

The role of outside responders at North Mara is described in the ECMP or within separate documents. No specific response roles are assigned to local communities in the ECMP, but locals are aware of the risk(s) associated with cyanide and what they should do in the event of a potential cyanide-related emergency via the training and education that North Mara have provided. Local Police contacts are included in the ECMP and will also be contacted if required, to assist with restricting access of village people to any contaminated area(s). North Mara have an Emergency Response team and clinic personnel: Health & Safety; and Environmental personnel that are suitably trained and will attend to assist with First Aid and remediation requirements if required. Note that North Mara are also set-up for medical evacuation by means of an Emergency Air Ambulance if required.

North Mara also has a Mutual Aid Agreement with its sister mine sites in Tanzania (Bulyanhulu, Tulawaka and Buzwagi mine sites) that describes roles accordingly and allows for assistance to be called from one or more of these mining operations.

**Standard of Practice 7.4**

*Develop procedures for internal and external emergency notification and reporting.*

The operation is in full **compliance** with Standard of Practice 7.4.

The ECMP includes contact information for notifying management, additional teams, regulatory agencies, outside response providers and personnel that may be involved in a cyanide emergency. Contact details have been addressed in a tabular format and a flow chart is in place that demonstrates how designated individuals are to be contacted in case of an emergency. Contact information to enable notification of local communities that may potentially be affected by a cyanide-related incident are included within the ECMP. For example, of the thirteen nearby villages considered appropriate to include, a contact name and title is provided: community name: and contact number.

In addition, in case of Crisis Management being required, North Mara will designate an External Affairs Coordinator to provide information to external parties such as local media, other media including media representatives who attend site, the local community and the Regional Business Unit’s External and Community Affairs Unit. This correlates with the Global Barrick Procedure for such an incident.
Standard of Practice 7.5

Incorporate into response plans and remediation measures monitoring elements that account for the additional hazards of using cyanide treatment chemicals.

The operation is in full compliance with Standard of Practice 7.5.

The operation is in full compliance with this Standard of Practice, requiring an operation to incorporate in response plans and remediation measures monitoring elements that account for the additional hazards of using cyanide treatment chemicals. The Plan prohibits the use of chemicals, such as calcium hypochlorite, ferrous sulphate and hydrogen peroxide to treat cyanide that has been released into surface water.

The ECMP requires that any accidental release of cyanide must be reported to the mine’s Environment Department. The Environment Officer is required to advise on the clean up and disposal of contaminated material, and environmental restoration. The requirements for environmental monitoring are stated in the ECMP.

The ECMP also states that North Mara will supply potable water to any people who may be affected by a major incident or who have restricted access to their drinking water as a result of a site incident. Water from the pond is treated on site and can be supplied to people on site and to the community. It is understood that a supply of 4,000 bottles of drinking water is also held on site by Sodexho and a further 1,500 water bottles retained by the warehouse. In case of breaking into this stock, a vehicle will immediately be dispatched to Mwanza to purchase additional supplies to provide extra water on site within 12 hours.

Standard of Practice 7.6

Periodically evaluate response procedures and capabilities and revise them as needed.

The operation is in full compliance with Standard of Practice 7.6.

The operation has recently reviewed its ECMP and shows commitment to continuing to do so. Verification within the document (‘Document History’ in-slip) shows it is to be reviewed and revised at least annually and/or following all cyanide related emergencies and drills.

Formal mock emergency response drills based on cyanide scenarios have been carried out and subsequent full debriefs are performed with detailed corrective actions, allocated to responsible personnel and dates by which they must be closed out. As part of the drill procedures and the subsequent follow up actions and responsibilities that are compiled, an ‘Emergency Response Action Tracker’ is in place. A progress bar colour-coding system is used to track the completion of these actions.

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The ECMP clearly states that the General Manager is responsible for ensuring that emergency drills are periodically conducted in all work areas. It is the responsibility then for Departmental Managers to coordinate emergency drills and implement recommendations; and the ERT personnel assist in conducting the drills and implementing any subsequent recommendations.
8. TRAINING

Train workers and emergency response personnel to manage cyanide in a safe and environmentally protective manner.

Standard of Practice 8.1

Train workers to understand the hazards associated with cyanide use.

The operation is in full compliance with Standard of Practice 8.1.

North Mara inducts and trains all visitors/personnel who may encounter cyanide in cyanide hazard recognition. Refresher training for cyanide and procedures is carried out every six months for all staff at risk of cyanide exposure. The cyanide awareness and assessments, and training records are maintained in both hard copy and electronic forms as appropriate.

Standard of Practice 8.2

Train appropriate personnel to operate the facility according to systems and procedures that protect human health, the community and the environment.

The operation is in full compliance with Standard of Practice 8.2.

The Operation at North Mara trains workers to perform their normal production tasks in a safe manner. Formal training is undertaken both in the classroom and on-site assessment by appropriately qualified trainers. Task training is based on North Mara’s written Standard Operating Procedures and testing and job observations are used to confirm the effectiveness of the training.

All workers must have undertaken the relevant training and have been deemed competent in cyanide-related tasks before they are allowed to continue independently. Cyanide refresher training is conducted every six months. Training records are maintained in personnel files and also monitored electronically via a training matrix spreadsheet.

Standard of Practice 8.3

Train appropriate workers and personnel to respond to worker exposures and environmental releases of cyanide.

The operation is in full compliance with Standard of Practice 8.3.
Cyanide awareness training is obligatory to all personnel who work in cyanide-areas or on cyanide-related tasks and refresher training is carried out bi-annually. In addition, personnel involved in specific cyanide-related tasks are trained and assessed in both the classroom-based course(s) and via on-site assessment(s) of how they perform their tasks against the sites SOPs. This includes procedures to be followed in case cyanide is released.

Both on- and off-site training is provided to all members of The Emergency Response Team (ERT) and all ERT members are trained in the procedures within the ECMP including decontamination and first aid. They undergo refresher training both internally and externally – an example of the former by means of maintaining weekly exercises relating to emergency response(s) and cyanide management within the Operation. It is considered all personnel involved in cyanide management (including ERT members) are appropriately trained in cyanide management.

At North Mara, each person has their own training record sheet and hard copies of training records are retained throughout an individual’s employment documenting the training they receive. These are backed up by electronically by the Barrick North Mara Process Plant Training Matrix.

Off-site responders with designated on-site roles are aware of the information included in the ECMP. Specific cyanide-related emergency drills have been undertaken at North Mara and a system is in place for the repetition of these events. Mock drills help to train workers and personnel to respond to potential exposure and/or environmental release(s) of cyanide. The General Manager is responsible for ensuring that emergency drills are periodically conducted in all work areas.
9. DIALOGUE

Engage in public consultation and disclosure.

**Standard of Practice 9.1**

*Provide stakeholders the opportunity to communicate issues of concern.*

The operation is in **full compliance** with Standard of Practice 9.1.

North Mara aims to achieve various methods to provide opportunities for stakeholders to communicate issues of concern regarding the management of cyanide. These include for example: series of cyanide awareness workshops; programme of monthly village tours; provision of a ‘open Community Centre and Community Development Department annual mine site tour; leaflet and newsletter drops; and the annual Barrick Responsibility Report is made available to all employees and to the public via the Barrick website. The ‘Annual Environmental Monitoring Report’ is also issued to the Ministry whereby feedback is available.

**Standard of Practice 9.2**

*Initiate dialogue describing cyanide management procedures and responsive address identified concerns.*

The operation is in **full compliance** with Standard of Practice 9.2.

North Mara has developed opportunities to convey cyanide management practices and procedures to and have created opportunities to interact with selected stakeholders. Information is provided relating to the use of cyanide. Presentations are delivered and leaflets are distributed to village representatives and local school pupils. Presentations delivered during these village tours cover various issues including potential dangers associated with cyanide; and what to do in case of an emergency. The Community Development Department is in the process of setting up representative offices in Nyangoto and Kerende villages. Seven villages around the mine site have been issued with notice boards to disseminate information relating to the mine and use of cyanide.

**Standard of Practice 9.3**

*Make appropriate operational and environmental information regarding cyanide available to stakeholders.*

The operation is in **full compliance** with Standard of Practice 9.3.
North Mara has developed written descriptions of how their activities are conducted and how cyanide is managed via presentations and descriptive leaflets. Cyanide management manuals are provided in Swahili and English to all stakeholders during sensitisation sessions. Documentation delivered to the local community is also available in both English and Swahili and distributed to village representatives and local schools, sometimes by the site workers themselves that live in surrounding villages. North Mara’s Community Relations Team can converse in both English and the local tongue (Swahili) and are able to deliver presentations in either language. Questions and answer sessions are key and predominantly performed in native tongue and evidence of this was seen by the auditor.

The operation has the mechanisms to make information publicly available following a cyanide release or exposure incidents, but no such incidents have occurred to date.

North Mara maintains the Barrick global RIMS database and is required to submit an annual report which feeds into the global Barrick Responsibility Report, published each year. The database includes specific monitoring data spreadsheets and would include any cyanide-related release or exposure incidents if they were to occur. The ‘Responsibility Report’ is distributed to all employees and made publicly available via the Barrick website (www.barrick.com). Barrick also issues quarterly magazines (in Swahili and English) which provide the opportunity to disseminate information regarding any cyanide release to employees.